ProjectOverview/ Concept/Milestones

Mr. Les Boord, NIOSH

CBRN Standards Development

- Why Develop New Respirator Standards (NIOSH Role)
  - None Exist
  - New Technology – Hazards
  - New Technology – Applied to Respirators
- Respirator Standards for Terrorism Agents
  - Fit All 3 Criteria
- Existing NIOSH or Military Standards are not completely applicable to meet a terrorism agent threat

CBRN Standards Development Process

A. Hazard Analysis
B. Protectability
C. Human Factors / Environmental Factors
D. Concept Definition
E. Requirements
F. Test Procedures / Validation
G. Quality Assurance Requirements

Development Process

- Being Conducted in Public Forum
- Meetings With
  - Stakeholders (NFPA, IACP, FEMA, OSHA, CBIRF, CPSC, IAFF, IAFC, IAB, NIJ)
  - Manufacturers
- Use of Website for Concept Papers
  - http://www.cdc.gov/niosh/npptl

CBRN APR Standard Goal & Target

Goal:

Develop a NIOSH NPPTL full facepiece air purifying respirator that addresses CBRN materials identified as inhalation hazards and/or possible terrorist hazards using a minimum number of filters for emergency responders.

Target: Four (4) Filters

	Short Duration	Long Duration
TIMs	15 Minutes	60 Minutes
TIMs plus CO	15 Minutes	60 Minutes

Hazards, First Step

- Hazard List Derived from 3 Sources, NIOSH, EN & MIL
- Category Grouping Addresses Approximately 110 Respiratory Hazards
- Hazards from Military High Threat Listing

Use Conditions

A. Warm Use: Less than IDLH concentrations; sustained warm zone support operations; long term use for decon, traffic control, rehabilitation, rescue and recovery; hazard known & quantified.

B. Crisis Provision: Contingency use for short duration, above IDLH concentrations, high physiological (flow) demand. Contingency for unforeseen factors such as secondary device or pockets of entrapped hazard.

Filter	Configuration	Long Duration Less Than IDLH	Crisis (Panic Demand)	Short Duration Less Than IDLH
Filter #1, TIM's less CO	Full Facepiece Back or Chest Mounted	60 Minutes*	5 Minutes*	
Filter #2, TIM's plus CO	Full Facepiece Back or Chest Mounted	60 Minutes*	5 Minutes*	
Filter #3, TIM's less CO	Full Facepiece Mask Mounted		5 Minutes*	15 Minutes*
Filter #4, TIM's plus CO	Full Facepiece Mask Mounted		5 Minutes*	15 Minutes*

* Indicated times are for illustration only. Actual times will be established from hazard modeling and developmental test results.

Interchangeability Concept

- Provision for Interchangeable Use of Consumable Filters
- Not Required but Requirements Identified
  - Optional for Manufacturers
- Considered Creative Alternatives Performance Based and Less Design Restrictive
  - Cumbersome to Implement in First Step Standard
- Utilize European Norms, EN 136 & EN 148

Draft Standard
Three Tier of Requirements

- 42 CFR, Part 84 – Applicable Sections
- Requirements Derived from other Standards/Specifications
- Special CBRN APR Requirements

Draft Standard – First Tier

- 42 CFR, Part 84

  1. 42 CFR, Part 84 Subparts A, B, D, E, F and G apply in total.

  These are:

  Subpart A: General Provisions
  Subpart B: Application for Approval
  Subpart D: Approval and Disapproval
  Subpart E: Quality Control
  Subpart F: Classification of Approved Respirators
  Subpart G: General Construction and Performance

Draft Standard – First Tier (continued)

2. 42 CFR, Part 84 Subpart I, the following paragraphs apply:
   - 84.110 Gas Masks; description
   - 84.111 Gas Masks; required components
   - 84.112 Canisters and cartridges in parallel; resistance requirements
   - 84.113 Canisters and cartridges; color and markings; requirements
   - 84.114 Filters used with canisters and cartridges; location; replacement
   - 84.115 Breathing tubes; minimum requirements
   - 84.116 Harnesses; installation and construction; minimum requirements
   - 84.117 Gas mask containers; minimum requirements
   - 84.118 Half mask facepieces, full facepieces, and mouthpieces; fit; minimum requirements
   - 84.119 Facepieces; eyepieces; minimum requirements
   - 84.120 Inhalation and exhalation valves; minimum requirements
   - 84.121 Head harnesses; minimum requirements
   - 84.123 Exhalation valve leakage test

Draft Standard – Second Tier

- Requirements Derived from other Standards/Specifications

  Human Factors / Environmental Factors Requirements:

- Facepiece Field of View	EN 136
- Lens Abrasion	NFPA 1981
- Communications	NFPA 1981
- Hot Conditioning	Mil-Std-810 F
- Cold Conditioning	Mil-Std-810 F
- Humid Conditioning	Mil-Std-810 F
- Vibration	Mil-Std-810 F
- Drop	Mil-Std-810 F
- Interchangeability	EN 136, EN 148
- Breathing Resistance	42 CFR, Part 84
- CO_2	42 CFR, Part 84

Draft Standard – Third Tier

- Special CBRN APR Requirements
  - Gas Life Testing
  - Systems CWA Penetration / Permeation
  - Laboratory Respiratory Protection Level

Test Matrix for CBRN Air Purifying Respirators

Test Order	Penetration and Permeation Testing	Particulate Testing	Service Life Testing, 64 lpm flow	Service Life Testing, high flow	42 CFR Testing	Drop (not order specific)	Human Factors (not order specific)	Interchange-ability
	6 APR systems (3 - GB and 3 - HD)	60 canister units	60 canister units	12 canister units	TBD APR systems	6 Canister Units (2 per test)	APR Systems --TBD -- (2 APR systems per test)	APR Systems --TBD --
1.	Hot diurnal	Hot diurnal	Hot diurnal	Service Life Testing, 100 LPM	Canister in Parallel Resistance Requirements, 84.112	Major axis vertical, air inlet down	Hydration (3)	EN 136 & EN 148
2.	Cold constant	Cold constant	Cold constant		Breathing Tube, 84.115	Major axis vertical, air inlet up	Optical Haze	
3.	Humidity	Humidity	Humidity		Facepieces; eyepieces minimum requirements, 84.119	Major axis horizontal	Communications	
4.	Transportation vibration	Transportation vibration	Transportation vibration		Exhalation valve leakage test, 84.123 (2)		Field of View	
5.	System testing (GB or HD)	Initial breathing resistance, 84.122	Initial breathing resistance, 84.122		Determine CO_2 levels (4)		Donning	
6.		DOP Testing, 84.181	Service Life Testing, 64 LPM				Fogging	
7.		Final breathing resistance, 84.122	Final breathing resistance, 84.122				LRPL Testing	

Draft for Discussion

Milestones for the CBRN APR Standards Development

1.Gas Mask First Step:

1. Concept Definition APR (Gas Mask)	April 15, 2002
2. APR Testing / Public Meeting	June 30, 2002
3. APR Detailed Standard Draft	August15,2002
4. Peer Review APR Standard	September 15, 2002
5. APR Standard Release	**October 15, 2002**
6. Implement Certification APR Program	December 31, 2002

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Milestones for the CBRN APR Standards Development

2. Escape Sets (APR):

1. Public Meeting	October 30, 2002
2. Peer Reviews	January 31, 2003
3. Standard Release	**March 31, 2003**
4. Implementation of Certification	July 31, 2002

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Milestones For The CBRN Standards Development

3. PAPR's

1. Public Meeting	January 31, 2003
2. Peer Reviews	March 31, 2003
3. Standard Release	**June 30, 2003**
4. Implementation of Certification	October 30, 2003

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